HARMONIA
International network for harmonization of atmospheric aerosol retrievals from ground based photometers

HARMONIA CA21119

Deliverable 5.4

Report on the dissemination of HARMONIA results to major stakeholder conferences

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1 Introduction

This deliverable reports how COST Action CA21119 HARMONIA disseminated its objectives and scientific results to major stakeholder conferences and related scientific meetings. There were engagements with photometer networks, atmospheric research infrastructures, meteorology, aerosol modelling, satellite remote sensing, radiation and solar energy communities during 2022–2026. They show repeated conference participation, targeted presentations of the Action, and exchanges that connected measurement harmonization with users of aerosol products.

Participation in these conferences and stakeholder meetings was conceived as a strategic initiative to bring scientific networks together with relevant end-users and to bridge the gap between HARMONIA's internal scientific community and external stakeholders. The intended stakeholder groups include the broader scientific community, policymakers, regulatory bodies, industrial partners, small and medium-sized enterprises (SMEs), and civil society groups. This scope describes the purpose of the participations; the evidence presented in this report identifies the stakeholder interactions documented also in other reports and on the website.

The report follows the definition of D5.4 in Section 4.1.2 of the Memorandum of Understanding: dissemination of HARMONIA results to major stakeholder conferences. It contributes to Objective O5 and WG5 tasks T5.1, T5.2 and T5.4. Publication output and internal workshops are included only as supporting context; they are not counted as external conference dissemination.

1.1 Reporting basis and scope

The evidence comprises the dissemination and exploitation workbook, the grants and scientific outputs workbook, and Maria João Costa's extended Virtual Mobility report on the scientific output of HARMONIA grants, supplemented by six WG5 and Management Committee presentations.

The extended report explains that the companion grants database was compiled through individual review of standard grant reports and, where available, extended reports, complemented by a Scopus funding-information search. The work was undertaken in collaboration with the Action's grant coordinator, Pavla Dagsson-Waldhauserova, including exchanges to clarify the information and validate the interpretation of identified outputs.

Conference lists under milestone M5.1 are treated as identified dissemination opportunities unless a presentation, session or participation outcome is also documented.

2 Dissemination strategy and stakeholder coverage

The Memorandum of Understanding proposes dedicated conference sessions, presentations to wider scientific communities, and links with operational programmes and measurement networks. The implemented activities combined broad forums such as EGU and EMS with specialist meetings such as AERONET, ACTRIS, EUMETSAT, IRS, ILRC, DUST, EAC and AeroCom–AeroSAT. This combination enabled the Action to discuss calibration and retrieval methods with measurement specialists while presenting their relevance to modelling, radiation and satellite applications. Within this strategy, conference participation serves both to communicate scientific results and to connect the Action's scientific networks with relevant end-users. It provides opportunities for dialogue with the broader scientific community, policymakers, regulatory bodies, industrial partners, SMEs and civil society groups, helping to relate HARMONIA's work to external needs and applications.

Stakeholder community	**Documented dissemination venues**	**Main relevance**
Photometer networks and metrology users	AERONET 2024; EMS 2023; IPC-XIV 2025	Calibration, traceability, harmonisation and use of aerosol optical depth
Atmospheric research infrastructures	ACTRIS Week 2023; ACTRIS Science Conferences 2024 and 2026	Long-term observations and aerosol product quality
Meteorology and geosciences	EGU 2023–2026; EMS 2023 and 2024	Aerosol impacts, radiation, climate and energy applications
Satellite, lidar and modelling communities	EUMETSAT 2023; AeroCom–AeroSAT 2024; ILRC 2024 and 2026; EarthCARE 2025	Validation, retrieval uncertainty and measurement synergies
Radiation, dust and aerosol specialists	IRS 2024; QOS 2024; DUST 2025; EAC 2025	Radiative effects, dust properties and complementary observations

The strongest audience coverage concerns scientists, measurement operators and research infrastructures. The AERONET account also records participation by instrument companies and software and data users. Solar energy relevance is evident in EMS and EGU contributions.

2.1 Identification of relevant conferences

The WG5 presentation in the final MC HARMONIA meeting on 3-4 September 2026 groups 32 conference events of interest for 2023–2026 into four categories: 16 major recurring events, nine specialist meetings, four broader geoscience and Earth observation events, and three networking or infrastructure events. Its chart distributes this landscape as seven events in 2023, 11 in 2024, nine in 2025 and five in 2026. These are planning and relevance counts supporting milestone M5.1, not a count of conferences attended or presentations delivered.

The recurring venues are EGU, ACTRIS Science Conference, IGARSS, EMS and ILRC. Specialist meetings include EAC, ELC, IRS, DUST, AERONET Science and Application Exchange and ATMOS. AGU, ESA Living Planet Symposium 2025 and AOGS extend the identified opportunities to the wider geoscience and Earth observation community. ACTRIS Week 2023–2025 is listed as a route for infrastructure alignment and networking. Participation is documented for only a subset of this landscape in the supplied activity and grant records.

The HARMONIA website Resources was used to publicize events. Grantee's activity descriptions and images were posted on the website and social media. This extends the visibility of conference contributions beyond the meeting itself.

3 Dissemination activities by year

3.1 Activities in 2023

At EGU 2023, Dimitra Kouklaki presented "The Aspire campaign: Assessing the effects of aerosols on solar radiation and energy in SE Europe". This was a contribution to WG3 and the application of aerosol observations to radiation and energy. Anna Gialitaki presented aerosol and surface retrievals using synthetic multi-angle, multispectral polarimeter signals at the 20th Electromagnetic and Light Scattering Conference, connecting the Action with light-scattering scientists and engineers.

EMS 2023 provided both Action-level and scientific dissemination. Stelios Kazadzis gave a 30-minute invited talk on aerosol sun photometry and HARMONIA, covering calibration, measurement homogenization, and links with the MAPP metrology project and ACTRIS. The reported discussions focused on transferring metrology-based traceability to routine photometer operation. A separate presentation by Lionel Doppler and co-authors, reviewed lessons from photometry campaigns undertaken during 2017–2022. Georgia Charalampous and Kyriakoula Papachristopoulou presented dust impacts on surface solar radiation in

Cyprus and aerosol-related uncertainties in NextSENSE2. These contributions reached radiation and energy meteorology sessions.

Anna Moustaka presented the direct shortwave radiative impact of tropospheric aerosols over North Africa, Europe and the Middle East at the EUMETSAT Satellite Meteorological Conference 2023 in Malmö. This subject is related with understanding satellite retrieval uncertainties and limitations. At ACTRIS Week 2023, the Action Co-Chair presented HARMONIA to the infrastructure community concerned with sustained, high-quality atmospheric observations.

3.2 Activities in 2024

The AERONET Science and Application Exchange, held on 17–19 September 2024 at the UMD Alumni Center in College Park, Maryland, USA, was a particularly relevant stakeholder meeting because its participants included network operators, aerosol scientists, instrument manufacturers and application users. Anca Nemuc presented "The European COST Networking Action Harmonia: International network for harmonization of atmospheric aerosol retrievals from ground-based photometers" in the Collaborative Research and Partnerships session. During the meeting there were a lot on interactions, discussions with AEROCAN, NEON, CARSNET and other AERONET partners, interest from students in joining HARMONIA activities, and discussions with NASA Goddard scientists about possible common calibration campaigns and instrument improvements.

EMS 2024, held in Barcelona and online on 2–6 September 2024, hosted session UP2.9, "Harmonia COST Action: Aerosol observations and links with atmospheric and solar energy studies". Conveners were Stelios Kazadzis, Kyriakoula Papachristopoulou and Lionel Doppler. There were 32 submitted abstracts and 19 oral and 13 poster presentations.

The session connected aerosol harmonization and calibration with ground-based and satellite observations, radiative transfer, satellite validation and solar energy applications. The programme scheduled the oral session and poster attendance on 3 September. Its open scope included HARMONIA and ACTRIS aerosol remote sensing communities as well as other researchers, directly supporting the aim to connect the Action's internal scientific community with external users.

EGU 2024 took place in Vienna and online on 14–19 April. AS3.29 is the relevant session. ITC-supported contributions included Anna Moustaka's study of lidar-ratio effects on CALIPSO retrievals and shortwave radiative effects over the NAMEE domain, and Nikolaos Papadimitriou's work on variability in solar power generation in the Eastern Mediterranean.

At the ACTRIS Science Conference in Rennes, France, on 13–16 May 2024, Ancuța-Gabriela Ciocan presented long-term aerosol optical properties and dominant aerosol types over Europe. The International Radiation Symposium was held in Hangzhou, China, on 17–21 June 2024. The IRS contribution associated with Kyriakoula Papachristopoulou addressed the sensitivity of aerosol direct radiative effects in cloudy EarthCARE scenes using one-dimensional and three-dimensional radiative transfer simulations. Together, these activities linked aerosol measurements with long-term characterization and radiative transfer applications.

ACTRIS 2024 further contributions were done by Stelios Kazadzis and co-authors: "Long range transport of smoke over Switzerland: aerosol properties and spectral features" and "Long term comparisons of aerosol optical depth measurements; differences and trends". These extend the account beyond grant-supported presentations, linking aerosol event characterization with consistency of long-term observations.

At the 31st International Laser Radar Conference in Landshut, Germany, on 23–28 June 2024, Peristera Paschou presented EarthCARE aerosol product validation plans, while Konstantinos Michailidis presented long-range smoke transport from Canadian forest fires to the Eastern Mediterranean.

Peter Hrabčák presented 30 years of ozone and aerosol optical depth measurements from the Brewer spectrophotometer at Poprad-Gánovce at the Quadrennial Ozone Symposium in Boulder. These contributions extended dissemination to lidar validation and ozone monitoring communities.

Sophie Vandenbussche presented a HARMONIA poster and a short slide introduction at the joint AeroCom–AeroSAT workshop in Lille, 14–18 October 2024.

3.3 Activities in 2025

At DUST 2025, Ancuța-Gabriela Ciocan presented "Twilight Zones and Tropics: Classifying Dust Where It Gets Complicated", and Andrea Torosantucci presented an evaluation of Saharan dust forecasts against observations at Lampedusa; both are recorded as posters. At EAC 2025, Alkistis Papetta gave an oral contribution on variability of dust optical properties during severe Mediterranean dust events, and Athina Savva had a poster contribution.

EGU 2025 records include an oral presentation by Simone Pulimeno and another one by S. Yeşer Aslanoğlu on intense Mediterranean dust events and photovoltaic power potential. Dimitra Kouklaki has an oral presentation during the EarthCARE Science and Validation Workshop 2025

Anna Moustaka had an oral contribution at the Fourteenth International Pyrheliometer Intercomparison, on evaluation of CAMS aerosol optical depth against sun-photometer observations.

3.4 Activities in 2026

The grants register contains 18 conference-linked records in 2026: 12 for EGU, two for the ACTRIS Science Conference and four for ILRC32. EGU contributions address SKYNET calibration, dust effects on photovoltaic production, EarthCARE validation using photometers and lidar, ultraviolet forecasting, calibration campaign analysis, and aerosol classification and source apportionment.

EGU 2026 HARMONIA session had 30 accepted contributions, comprising 10 talks and 20 posters. EGU was held in Vienna and online on 3–8 May 2026. The official programme identifies session AS3.43, “Aerosol observations and links with atmospheric, climate and solar energy studies; Results of the Harmonia COST Networking Action”, convened by Stelios Kazadzis with África Barreto, Dimitra Kouklaki and Carlos Toledano. Orals were scheduled on 7 May, 16:15–18:00, in Room 1.85/86, with onsite poster attendance earlier that afternoon and a separate virtual poster slot. The session addressed measurement techniques, harmonization, cross-network comparability, aerosol optical properties, field campaigns, radiative transfer, satellite validation and solar energy applications. Its open invitation to HARMONIA, ACTRIS and other researchers provided a direct mechanism for wider scientific exchange.

The ACTRIS Science Conference 2026 was held in Oslo, Norway, on 20–23 April 2026. Antonis Gkikas had an oral output and Aspasia Pallikaridou a poster.

ILRC32 was held in Hiroshima, Japan, on 5–10 July 2026. Its grant records include Daniele Bortoli, Georgia Peletidou, Alkistis Papetta and Aspasia Pallikaridou. Bortoli’s title concerns aerosol hygroscopic growth using multi-instrument observations at Évora.

4 Quantitative overview

The extended VM report of Maria Costa presents the same portfolio-level summary of 43 recorded presentation outputs, comprising 21 oral and 22 poster outputs, across dissemination conference, ITC, YRI and Virtual Mobility schemes.

Year	External conference records	Oral outputs	Poster outputs
2023	6	3	3
2024	8	5	3
2025	7	4	3
2026	18	7	13
Total	39	19	22

Session statistics supplement the grant-based overview as follows. EMS 2024 has 34 submitted abstracts recorded in the May update and 32 presentations reported retrospectively. EGU 2026 has 30 accepted contributions and an allocation of 10 talks and 20 posters reported.

Session	Scope of figure	Reported breakdown
EMS 2024 UP2.9	34 submitted abstracts; 32 reported presentations	19 oral; 13 posters
EGU 2026 AS3.43	30 accepted contributions;	10 talks; 20 posters

The external conference records comprise 16 ITC conference grants, 19 Young Researcher and Innovator conference grants, two dissemination conference grants and two Virtual Mobility records with conference outputs. The transition in grant terminology is retained from the sources. These records show how conference support enabled participation.

5 Stakeholder interactions and use of results

The clearest recorded interaction concerns the transfer of calibration and measurement quality knowledge. EMS 2023 discussions connected HARMONIA, MAPP and ACTRIS and examined the feasibility of metrological traceability in operational photometry. The AERONET exchange connected the Action with international networks and instrument stakeholders and opened discussions on calibration campaigns and instrument

development. These activities align with the Action's objective to improve and homogenize aerosol retrievals across measurement systems.

A second pathway connected measurement products with their users. EGU and EMS contributions addressed radiation and solar energy; EUMETSAT, ILRC and EarthCARE activities addressed satellite validation and retrieval uncertainty; IRS addressed radiative transfer; and AeroCom–AeroSAT provided direct contact with modelling and satellite communities. The user survey at AeroCom–AeroSAT is the strongest documented mechanism for collecting structured user feedback, although its response and analysis results are not supplied.

The evidence supports conclusions about dissemination; stakeholder contact and opportunities for knowledge exchange.

The extended grant review reports that conference participation enabled researchers to obtain feedback on methods and preliminary results, establish scientific contacts and explore collaborations. It also notes follow-up research and pathways towards publications and new projects in several grant reports. This supports interpreting conference participation as scientific exchange and capacity building as well as dissemination. Because the extended report synthesizes outcomes across the portfolio without assigning each outcome to a named conference, these findings are reported at programme level rather than attributed to individual meetings.

5.1 Publications as supporting dissemination

The scientific output workbook contains 45 Scopus-indexed records: 11 dated 2023, 12 dated 2024, 12 dated 2025 and 10 dated 2026. The extended report specifies that these were retrieved on 23 August 2026 by searching Scopus funding-information fields for "CA21119" or "COST Action HARMONIA".

6 Conclusions

HARMONIA disseminated its results through a combination of recurring international conferences and targeted stakeholder meetings during 2023–2026. Broad scientific visibility at EGU and EMS was complemented by direct engagement with photometer networks, atmospheric infrastructures, lidar and satellite communities, radiation specialists and aerosol modelers. The records document contributions addressing calibration, aerosol retrieval uncertainty, aerosol characterization, radiative effects and energy applications.

The most substantive reported stakeholder outcomes are discussions on traceability and operational photometry at EMS, international network contacts and possible calibration

collaborations at AERONET, and user engagement through the AeroCom–AeroSAT survey. Grant support provided a recurring route for researchers to present relevant work.

Annex A Conference linked grant records

The following register includes external conference-linked records used in Section 4.

2023

Row	Presenter	Conference	Recorded activity title
3	Anna Moustaka	EUMETSAT 2023	Assessment of the CALIOP-CALIPSO retrievals towards estimating dust direct radiative effects in North Africa, Europe and Middle
6	Anna Gialitaki	ELS 2023	Retrieval of aerosol and surface properties with synthetic signals from a multi-angle, multi-spectral polarimeter
8	Dimitra Kouklaki	EGU 2023	The Aspire campaign: Assessing the effects of aerosols on solar radiation and energy in SE Europe.
12	Georgia Charalampous	EMS 2023	Dust impact on surface solar radiation levels in Cyprus
19	Kyriakoula Papachristopoulou	EMS 2023	Assessing aerosol related uncertainties in the NextSENSE2 system
21	Stelios Kazadzis	EMS 2023	Aerosol sun photometry state of the art and progress and the COST action Harmonia

2024

Row	Presenter	Conference	Recorded activity title
25	Kyriakoula Papachristopoulou	IRS 2024	Overview of the use of the ground-based sun photometric aerosol retrievals to radiative transfer-based applications
27	Anna Moustaka	EGU 2024	Assessing lidar ratio impact on CALIPSO retrievals utilized for estimating aerosol SW radiative effects over the NAMEE domain

Row	Presenter	Conference	Recorded activity title
28	Peristera Paschou	ILRC 2024	Validation Plans for the EarthCARE Aerosol Products Using the ATLID Lidar Simulator and the ESA and ACTRIS lidar systems
31	Ancuta-Gabriela Ciocan	ACTRIS 2024	Long term analysis of aerosol optical properties and dominant types over Europe
37	Peter Hrabčák	QOS 2024	30 years of total ozone and AOD measurements using the Brewer spectrophotometer in Poprad-Gánovce, Slovakia
43	Nikolaos Papadimitriou	EGU 2024	In person participation to the EGU24 conference
44	ANCA NEMUC	AERONET 2024	The European COST Networking Action Harmonia: International network for harmonization of atmospheric aerosol retrievals from ground-based photometers
46	Konstantinos Michailidis	ILRC 2024	A long-range smoke transport from Canadian forest fires to the Eastern Mediterranean during August 2023

2025

Row	Presenter	Conference	Recorded activity title
52	Ancuta-Gabriela Ciocan	DUST 2025	Twilight Zones and Tropics: Classifying Dust Where It Gets Complicated
59	Alkistis Papetta	EAC 2025	Oral presentation at EAC 2025 Title: Variability of Dust Optical Properties during Severe Dust Events over the Mediterranean
61	Athina Savva	EAC 2025	Request for fund for the European Aerosol Conference 2025
64	Andrea Torosantucci	DUST 2025	EVALUATION OF SAHARAN DUST OUTFLOWS FORECASTED BY THE MINNI-FORAIR-IT AIR QUALITY MODEL WITH OBSERVATIONS CARRIED OUT AT THE STATION OF CLIMATE OBSERVATION OF LAMPEDUSA
67	Simone Pulimeno	EGU 2025	EGU25 oral presentation

Row	Presenter	Conference	Recorded activity title
68	S. Yeşer Aslanoğlu	EGU 2025	Intense dust events over the Mediterranean Basin and their impact on PV power potential
73	Dimitra Kouklaki	EarthCARE 2025	ITC Conference Grant

2026

Row	Presenter	Conference	Recorded activity title
74	Nikolaos Papadimitriou	EGU 2026	EGU26 in person participation
75	Athina Savva	EGU 2026	Request for fund for the EGU General Assembly, 2026
76	Gaurav Kumar	EGU 2026	Evaluation and advancement of the SKYNET Improved Langley Plot method in the Mediterranean area
77	Daniele Bortoli	ILRC 2026	Synergistic characterization of aerosol hygroscopic growth using multi-instrument observations at the Évora Atmospheric Sciences Observatory (EVASO)
79	Georgia Peletidou	ILRC 2026	Young Researcher and Innovator (YRI) Conference Grants, 2025-26 CALL
81	Alkistis Papetta	ILRC 2026	Poster presentation at ILRC2026, Japan
82	György Varga	EGU 2026	Beyond aerosol extinction: dominant indirect effects of Saharan dust on photovoltaic energy production in Central Europe
83	Stefano Sensi	EGU 2026	Validation of L2 EarthCARE Aerosol Products with co-located SKYNET and AERONET photometers observation complemented by lidar profilers at the Rome Tor Vergata atmospheric observatory (Italy)
86	Theodora Stavraka	EGU 2026	In person participation EGU26

Row	Presenter	Conference	Recorded activity title
90	Georgia Charalampous	EGU 2026	YRI Conference Grant: Evaluation of the Cyprus UV Index (UVI) Forecasting System Over One Year of Observations: Assessing the Impact of Ozone and Aerosols
92	Meritxell Garcia	EGU 2026	Analysis of SKYNET derived AOD during the FRC VI campaign in Davos, and validation of improved data processing and calibration algorithms
95	Celia Herrero del Barrio	EGU 2026	Young Researcher and Innovator Conference for Harmonia session on EGU26
96	Aspasia Pallikaridou	ACTRIS 2026	Young Researcher and Innovator (YRI) Conference Grants
97	Aspasia Pallikaridou	ILRC 2026	Young Researcher and Innovator (YRI) Conference Grants for ILRC32
98	Antonis Gkikas	ACTRIS 2026	ITC Conference Grants
101	Iveta Steinberga	EGU 2026	Complementary air mass analysis and aerosol classification for improved source apportionment
102	Sara Herrero-Anta	EGU 2026	YRI Conference Grant
105	Nadia Kairaktidi	EGU 2026	Participation in EGU 2026 – HARMONIA Session (CA21119)